The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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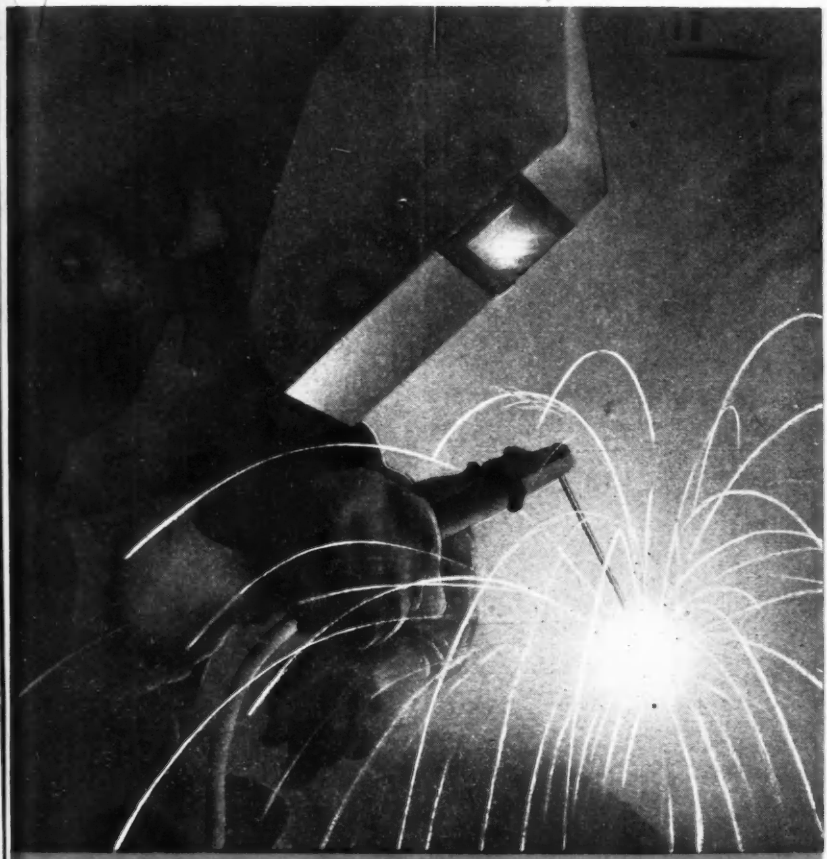

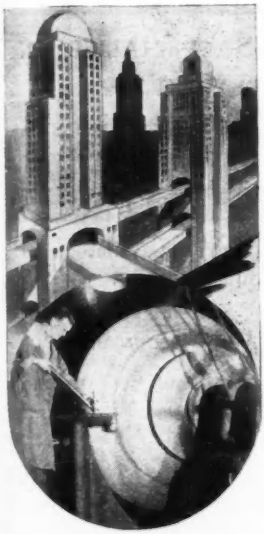

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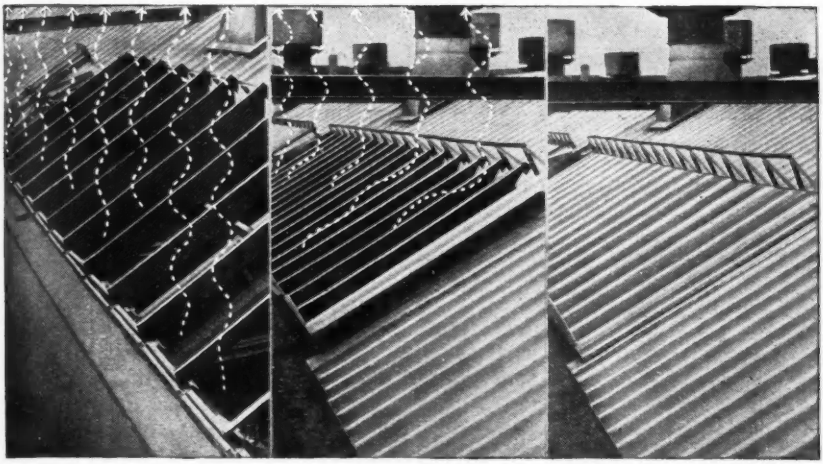

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The Chemical Age

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The Importance of Oil

THE British nation first became conscious of the importance of oil in the early years of this century, when Mr. Churchill, then at the Admiralty, took steps to secure the supply of fuel oil in a world oil market dominated by American, Dutch, and Russian interests. Because petroleum has been primarily a fuel, the British public has never really understood its world importance in the industrial sense. Oil is one of America's half-dozen major industries, and is controlled by vast financial interests. Industry and politics have always been closely interwoven in that country, and consequently oil is also part of the political game. An interesting series of articles in the *Manchester Guardian* on the moves of the oil game during the past two or three years, coupled with common knowledge of what has gone before, reveals oil as having properties of a peculiarly explosive nature in the field of international politics.

The years following the close of the last war saw quite a fight for the world's oil wells. Some American writers even spoke of imminent war between this country and America upon this issue. Here is one such quotation: "Rightly or wrongly we are actively preparing for the Anglo-American war which our naval men believe will be fought to determine commercial supremacy," but the writer had the grace to add that "the fact that an economic financial empire such as ours (*i.e.*, U.S.A.) can profit more from productive peace than from destructive war may in turn convince American imperialists that compromise is the better way." The struggle for oil, however, continued until it could be said that "The British position is impregnable. All known oilfields, all the likely or probable fields outside the United States and Russia are in British hands or under British management or control, or financed by British capital." This was an equally explosive situation and one which the financial bosses of the oil industry might have been tempted to turn into political capital. Perhaps fortunately, the war changed everything, and at the time when Britain stood alone, American help in the field of oil was no less generous than it was in other respects.

That, however, is not the end of the oil problem. In 1942, the American oil industry asked for an increase in the price of crude oil, which the American Government resisted. The oil industry thereupon carried

On Other Pages

the fight into the political field and declared that their Government's policy had threatened the future of their home oil supplies. Estimates were trotted out that American oil reserves would only last for another 20 years. The American Government thereupon formed the Petroleum Reserve Company, a Government agency with powers to acquire oil reserves, and build refineries and pipelines. That Government also announced that it proposed to develop the American-held rights in Arabia and to build a pipeline to the Mediterranean. That raised immediate alarm. The last thing the oil magnates wanted was for the Government to enter the oil business. Moreover, the pipe-line to the Mediterranean was extremely inconvenient from their point of view. The U.S.A. has now become a high-cost oil area as compared with other parts of the world. Arabian oil, however, can be produced very cheaply, but it cannot compete in the Western markets so long as it has to be shipped through the Suez Canal, which charges a toll of 7s. a ton. Via Suez, Bahrein is as far from England as California, and about as far from the European continent as the Mexican Gulf ports. But if a pipe-line were built to bring Arabian oil direct to the Mediterranean the port of shipment would be about as near to London as the Eastern American ports and only 1100 miles from the southern coast of Europe. It could then be delivered f.o.b. Haifa at about 70-80 cents per barrel, compared with a price of $1.10 f.o.b. Gulf of Mexico or $1.50 f.o.b. Atlantic seaport. As exports of finished oil products from the U.S.A. and Central America account for some 50 or 60 per cent. of the British-European imports, it is clear that the Arabian pipeline would offer a grave threat to established interests. The oil magnates in the U.S.A. were thus hoist with their own petard. The experts who had declared that U.S.A. supplies would last for only 15 or 20 years, now maintained with equal assurance that the U.S.A. has enough oil reserves to last for 1000 years!

It is safe to assume, says the *Manchester Guardian* (July 28 last), that the older companies will support the Arabian project, as well as the agreement with the British Government, provided that they are allowed to share with the Californian Standard Oil and the Texas Corporation in the development. The objective of the British and American Governments is the establishment of genuine intergovernmental control of the world's oil production, refining, and marketing—always excluding the domestic oil affairs of the United States. An open covenant between the two nations was signed in August, and must be hailed as a great improvement on the rather vague, and not always public, agreements between private companies, which appear to have such internationally-explosive potentialities. This pact provides that all peaceable nations shall be assured of adequate oil supplies. The fear has been expressed, however (*c.f. Manchester Guardian*, August 10), that while excellent in the political field, the pact may be based upon the *status quo*, which would strangle British enterprise in the future. Petroleum is no longer to be regarded as a fuel. It is now known to be a storehouse of hydrocarbons already serving as the basis of a chemical industry. We have discussed this subject on previous occasions in these columns and there is no need to labour that aspect of the situation. The important factor is that in this country we should be free to refine our own oil requirements at home and thus to set up that organic chemical industry which now seems to be the perquisite of other nations. Experience, rather bitter experience, has shown us that if we let other nations specialise in certain lines of business, such as the design and erection of complete chemical works, we lose the power to compete.

Freedom to obtain raw materials is not the only essential in technical industries. It is also important that all industrial nations should have freedom to gain knowledge and experience of branches of chemical and other manufactures that come within their scope. Britain has a large say nowadays in petroleum affairs, so let us not allow ourselves to be denied the power to compete with other nations in the design and erection of refineries, and in the manufacture of synthetic chemicals based on petroleum hydrocarbons. The provisions of the pact, and the (possibly secret) ramifications of the international petroleum industry must be carefully scrutinised to ensure that our position is safeguarded.

NOTES AND COMMENTS

The Universities' Function

DISCIPLINED and critical judgments in every walk of life are needed more to-day than at any other time in the world's history. This opinion, with which most will agree, was expressed by Dr. Pye, Provost of University College, London, in an address earlier this month before the London Institute of World Affairs. Dr. Pye was discussing the post-war function of the universities, and he urged that their chief duty would be the production of graduates with disciplined and at the same time interested minds. To achieve this end, one of the principal requirements, he concluded, was an improvement in scientific education. All who have any concern with scientific industry will agree with him; indeed, through their representative bodies, they have expressed the same opinion often already. But a reinforcement of their views from one so distinguished in the world of education as the Provost of U.C.L. is more than welcome. In direct relation with industry, Dr. Pye further stated, the primary responsibility of the universities was to supply qualified men and women —"able, lively, executives with trained minds and initiative, capable of seizing upon and developing a new idea or a promising new process." We shall never have really efficient scientific industries, in Dr. Pye's view, until an understanding of what Science can do for Industry, and of the conditions under which a research department can be made productive and helpful, has become disseminated "throughout the whole of industrial organisation, from the board of directors to the workmen at the bench.

Relations with the Government

DR. PYE also advocated a closer connection between the younger members of the university staffs and those in research and other establishments working for the Government; many of those now serving in an advisory capacity on Government behalf should be retained after the war in the same or a similar rôle. Independent research workers in university laboratories, we agree, will be none the worse for understanding something of the complicated administrative problems that beset an executive department—even a scientific one! Yet that should not divert the universities from their main and fundamental purpose—the advancement of knowledge and of reasoned criticism in world affairs.

Wholesale Prices Increase

THE Board of Trade Index Figure for the wholesale prices of industrial materials and manufactures rose by 0.9 per cent. last month, the largest rise recorded since December, 1940. The figure for August was 171.7, compared with 170.1 for July and 163.9 for August last year (taking 100 as the average for 1930). The main cause for this increase was a substantial rise—10.9 per cent.—in the price of coal. The figure for iron and steel rose from 183.4 in July to 184.5 in August (0.7 per cent.), an increase entirely due to the change in the controlled prices of manufactured goods: crown iron, hoops, and marked bars, for example, each advanced by £2 7s. 6d. per ton, representing increases of about 15, 14, and 13 per cent. respectively. As these changes came into effect on August 15, the increases taken into account are about half those mentioned. Non-ferrous metal prices were stationary and the figure for chemicals and oils rose fractionally from 151.0 to 151.1. This rise in manufactured articles was offset by a fall of 1.1 per cent. in the wholesale prices for food and tobacco.

Fuel Pointers from Wales

THE South Wales Fuel Efficiency Committee, under the chairmanship of Mr. Edmund Hann, has in the past two years saved about 250,000 tons of coal which was previously wasted. This fact was disclosed in Cardiff the other day by Mr. Tom Evans, of Cardiff University, in an address to city Rotarians. Mr. Evans scouted the suggestion that we might "revert to those lackadaisical pre-war conditions of not caring whether we burn our coal efficiently or not." He reminded his hearers that after the war Britain would have to compete in the export coal market with the U.S.A. and U.S.S.R., with their larger plants and bigger research programmes, so that the

most economical use of coal was a subject for urgent investigation. Mr. Evans, we consider, has sounded a timely note of warning, and the methods he suggests for avoiding a lapse into inefficiency are eminently practical. In South Wales, he points out, there is great scope for the replacement of antiquated boilers; there is a shortage of suitable recording instruments, especially for measuring power; and full training in the science of combustion engineering (at present unobtainable in South Wales) is essential. These points are no doubt particularly urgent in Mr. Evans's own province, but we can think of several parts of Britain where a certain tightening up in these and other directions would not come amiss.

Pectate Pulp

A STRIKING instance of the way in which an apparently superabundant raw material can be brought into new use is recorded in the July issue of the New York *Rubber Age*. It appears that the research department of the California Fruit Growers' Exchange, anxious to find industrial outlets for the fresh raw peel of citrus fruits after the juice and essential oils had been extracted, chose the pectic substance of the peel as the most promising ingredient to work on. Pectic acid and pectates of a type giving relatively amorphous granular precipitates with alcohol have long been known and used, and the discovery of a new fibrous form was the turning point of this investigation. A method of "pectation" was devised whereby the large molecular size of the native protopectin of the peel was preserved in an insoluble complex pictured as consisting of sodium calcium pectate and cellulose. Being insoluble at this stage it can be repeatedly washed and pressed with but little loss and then dried and ground. A small addition of sodium phosphate is made and the pectate pulp is dispersed in hot water by strong agitation. Cleavage of the complex takes place and there results a finely divided suspension of cellulosic material in a colloidal solution of sodium pectate. This aqueous dispersion has proved invaluable as a coating for the cardboard or paper containers in which synthetic rubber is transported. The synthetic material has a much greater tendency to adhere to the package than has crude natural rubber. The pectate pulp film, though extremely thin, effectively prevents contact between rubber and paper; the rubber actually adheres strongly to the pectate film, which is torn away from the paper and carried through with the rubber, in subsequent processing, as a negligible and entirely innocuous constituent.

The Use of Mercury

SINCE autumn last, mercury supplies of the United Nations have been far in excess of requirements. By the occupation of the Monte Amiata mining region in Tuscany, supplies have been increased even further, but there is no recent news regarding the fate of the Idria mercury mines, which, some time ago, were reported to have been rendered useless, or at least extensively damaged, by Marshal Tito's men. It is significant that, according to a survey prepared in the United States, no major changes have occurred in the utilisation of the liquid metal, although output has been about 50 per cent. higher than in pre-war years. Pride of place in the use of mercury is still held by the pharmaceutical industry, closely followed by catalysts; in addition, the metal is being employed in the electrolytic production of chlorine and of caustic soda, in a wide range of indicators, and in anti-fouling marine paint. Well into the second half of 1943, prices stood at a record high level, discouraging research into new methods of use. Since then, however, U.S. prices have fallen by roughly 50 per cent. Moreover, the powerful position of the Italo-Spanish mercury cartel has been broken, in particular by the increased output both in Mexico and in the United States. There is, therefore, reason to believe that post-war prices will be stabilised at a more reasonable level.

A.C.S ACQUIRES OIL PATENTS

As foreshadowed in THE CHEMICAL AGE of September 16, ownership of the Universal Oil Products Company—the capital of which was in the hands of seven leading U.S. oil companies—is being transferred to the American Chemical Society, according to an announcement by Dr. Thomas Midgley, president of the Society. The value of the company is estimated at about £3,000,000, with a sum of £250,000 available annually for research.

Fused Metal Resinates*

Their Preparation and Properties

METAL resinates, or metal salts of rosin, have an important place in industry to-day. Their resinous nature, metal content, high melting point, and solubility in organic solvents, as well as other desirable properties have earned them a wide variety of uses, some of them only recently explored. Among them may be mentioned the employment of resinates as driers in paints, varnishes, and inks, as resins in printing inks, as resins for coating compositions and plastics, in combination with cellulose products such as ethyl cellulose, as stabilisers for chlorinated rubber compositions, and as fungicides.

Homogeneous resinates, free of suspended matter and crystals, are needed in many of these applications. A high metal content is advantageous; in general, the value of a particular resinate will increase as the metal concentration becomes greater unless this contribution is offset by an adverse effect on some other property such as solubility. For example, within reasonable limits the higher the percentage of a drier metal in a given resinate, the more powerful that resinates becomes as a drier; or the larger the calcium content of a resinate, the higher will be its melting point, the more viscous will be its solutions and the greater its value as an ink resin.

Three Preparation Methods

Metal resinates have been prepared by three different methods—precipitation process, solvent process, and fusion process. Resinates prepared by either the fusion or solvent process are similar in nature, and have the advantages of resinous appearance, good solubility, freedom from suspended matter, and less tendency toward spontaneous combustion than is encountered with the finely divided precipitated resinates. The fusion process, in addition, is a simpler operation than either the precipitation or solvent process, and eliminates the expense and hazard resulting from the use of a solvent.

By the precipitation process it has been possible to produce resinates containing the theoretical metal content of the neutral salt. Resinates prepared by the solvent or fusion methods, however, have heretofore been limited in many cases to a fraction of the theoretical metal content by crystallisation (blocking) during preparation, which prevents the reaction from going to completion. The work reported here was undertaken to prepare homogeneous fused resinates with at least as high metal contents as the precipitated resinates, and thus to obtain products by the cheaper fusion method which would combine the advantages of fused resinates and the high metal content previously reached only through the precipitation process. Another purpose was to prepare resinates of a variety of metals from both regular and modified rosins and to compare their properties.

This paper is limited to a report on the successful preparation by the fusion method of calcium, cobalt, copper, manganese, lead, and zinc resinates. They were prepared from wood rosin of N colour grade representing a typical refined wood rosin; Staybelite, representing commercial hydrogenated rosin; Poly-pale, representing commercial polymerised rosin; and disproportionated wood rosin.

The Fusion Process

The following procedure was usually found to be satisfactory except in the special cases to be described later. The rosin was melted and heated to about 250°C. with agitation. The required amount of metal diacetate was added slowly to the molten rosin. Although the metal diacetates were generally used, in some cases the cheaper oxides or hydroxides such as those of calcium, lead, manganese, and zinc were found to be satisfactory over a limited range of metal content and over a wider range if catalysed with acetic acid or the metal diacetate. After the addition of small portions of the metal compound, time was allowed for foaming to subside and the reaction to become substantially complete before the addition of another portion. In general, a 15-90 minute addition period was required, followed by an extra cooking period of 15-60 minutes to ensure complete reaction. Excessively long cooking times tended to produce non-homogeneous products and were therefore avoided.

As the metal compound and rosin reacted, the viscosity increased and it became desirable to raise the temperature in order to speed the reaction and prevent excessive foaming. A maximum temperature of 285° to 295°C. was usually sufficient. A neutral atmosphere of nitrogen or carbon dioxide above the reactants was employed to prevent oxidation and discoloration of the resinates. Bubbling an inert gas through the molten reaction mixture was helpful in removing acetic acid given off by the reaction between the rosin and the metal diacetates, and it was especially beneficial in the preparation of the resinates of higher

* From an article by J. N. Borglin, P. R. Mosher and H. A. Elliott (Hercules Powder Co., Wilmington, Del.) in *Ind. Eng. Chem.*, 1944, **36**, 8, p. 752.

melting points which were very viscous during the preparation.

It was necessary to modify the above procedure in some cases to avoid heterogeneous resinates or, if they were encountered, to use a special technique to make them homogeneous again. Heterogeneous resinates could be recognised by an opacity which was not due to the natural colour of the resinate but was caused by suspended matter or crystallisation. If the resinate was of the opaque type, consisting of a suspended precipitate in a resin-like matrix, it was made homogeneous in most cases by diluting the resinate with rosin until the mix cleared. The success of this remedy indicated that the precipitate was probably unreacted salt or oxide. After this precipitate had reacted with the excess of rosin, the metal content could be increased again just as if the mix had never been in two phases. This opaque type resulted from adding more metal salt than would react with the rosin or from cooking too long at high temperatures. The copper resinates had a special tendency to form this type and had to be prepared at temperatures below 200°C. with special care to prevent local overheating in order to avoid the formation of a reddish-brown precipitate.

The second or crystalline type gave a blocked resinate consisting of a crystalline phase in an amorphous resin-like matrix. It was overcome by raising the temperature of the reaction mixture to 285-320°C. to keep the resinate fluid and by adding enough calcium acetate to supply 0.5-2.0 per cent. calcium in the resinate. The latter was often unnecessary, however, since zinc and cobalt resinates which ordinarily block in the range of 3-12 per cent. metal could be prepared with more than 12 per cent., provided the temperature was maintained. Manganese resinates also exhibited this blocking tendency at metal concentrations above approximately 3 per cent.

Properties of Resinates

Homogeneous fused resinates were amorphous solids. Their colours varied widely. Calcium, lead, and zinc resinates resembled the refined wood rosins in colour, and manganese resinates resembled the darker grades of rosin. Copper resinates were deep green and cobalt resinates bright purple.

The following were found to be the maximum metal contents of the resinates examined: calcium, 6 per cent.; cobalt, 19 per cent.; copper, 8-9 per cent.; lead, 40 per cent. (29 per cent. from polymerised rosin); manganese, 6-8 per cent.; zinc, 18 per cent. (23 per cent. from polymerised rosin). The theoretical metal contents (per cent.) of the corresponding diabietates are, Ca, 6.2; Co, 8.9; Cu, 9.6; Pb, 25.5; Mn, 8.4; Zn, 9.8. The resinates with metal contents considerably higher than the theoretical value for their diabietates were probably complex metal salts of the acetate-abietate type. This possibility was indicated by the presence of appreciable combined acetic acid in resinates with greater than theoretical metal content. Below theoretical metal content the acetic acid content was negligible.

All the resinates examined showed good solubility in organic solvents if the metal content was not too high. Zinc resinates had exceptional solubility; resinates were soluble which contained almost twice as much zinc as the diabietate did theoretically. Lead resinates of Poly-pale were completely soluble at high lead contents; the lead resinates of regular rosin and Staybelite with above 5-10 per cent. lead tended to precipitate from solution and to form gels, respectively.

Melting Points

The Hercules thermometer bulb drop method† was used to determine melting points of resinates, prepared by the reaction of metal diacetate and rosin. The melting point of a metal resinate is dependent upon the metal used, the rosin used, the amount of metal in the resinate, and, to a lesser extent, the procedure by which the resinate is prepared. Resinates of identical metal content and from the same rosin have shown variations as great as 10-25°C. in melting point when conditions of preparation were changed. All the resinates, however, had higher melting points than the rosins from which they were prepared. Calcium resinates increase in melting-point 20-22°C. for each 1 per cent. of calcium; lead and copper resinates only 2-4°C. for each 1 per cent. of metal; the other resinates examined show intermediate rises.

Some resinates could not be blended by fusion with some rosins without blocking. Resinates of lower metal content should be more compatible, as the dilution with rosin would tend to lower the metal content to a point below the blocking range. All the resinates could be blended with polymerised rosin without blocking. All the resinates except the cobalt and zinc resinates of Staybelite (hydrogenated rosin) were compatible with Staybelite. N wood rosin as a blending agent caused blocking with cobalt and zinc resinates.

† H. E. Nash, *Ind. Eng. Chem.*, 1932, **24**, p. 178.

The capacity of the Gruvön and Säffle paper mills of the Swedish Billeruds company is to be increased from the present annual output of some 50,000 tons to about 65,000 tons. In the sulphate works at Gruvön a Tomlinson plant will be installed.

Grass-Tree Resins

A Supplement to Shellac in Varnishes

RESINS of the grass-tree (*Xanthorrhœa* spp.), known in its native Australia as the blackboy or yacka, are discussed in a paper published by the Imperial Institute (*Bull. Imp. Inst.*, 1944, *42*, 2, 74) by arrangement with the Secretary, Australian Scientific Research Liaison. These resins are true resins, not gums (despite the local appellations of yacka gum, Botany Bay gum, etc.), as they are insoluble in water but soluble in alcohol. The species *X. hastilis* yields a yellow resin, but all other species a red resin.

At present Xanthorrhœa resin is used in munition work for pyrotechnical compositions and as a high-melting-point lacquer and varnish for metals; before the war it served as an ingredient of certain proprietary polishes made in New South Wales. Experiments carried out at the Imperial Institute showed that the yellow resin could be used in sealing-wax, either alone or mixed with shellac, while it is reported that the red resin was found, in Germany, to be preferable in the manufacture of coloured spirit varnishes to those made by dissolving dragon's blood, gamboge, and saffron in alcohol. As these resins have the property of absorbing chemically active light rays, they have been used for painting over the windows of photographic dark-rooms. Generally speaking, the resins find their principal uses in mixtures with shellac in the manufacture of metal lacquers and wood varnishes. In the latter the coat was less brilliant than that from resin varnish, but showed better resistance to wear. Chemical examination of the resin has shown it to be a highly complicated substance, and very little is known of the actual composition of the resin of any of the species.

A certain amount of the red resin is being exported to Great Britain (about 150 tons per annum), the U.S.A. (about 90 tons), and in very small quantities, to India and New Zealand. In 1939-40 South Australia supplied 2096 tons for export, and Western Australia 338 tons; which figures may be compared with the South Australian export total of 2708 tons (98 per cent. of the Australian total) in 1928-29.

THE CHEMICAL CLUB

At the last committee meeting of the Chemical Club, on September 11, it was stated that for the year ending August 31, 1944, 62 new members had joined, five had been reinstated, seven had resigned, and three had died, giving a total increase of 57. Since the end of the year more new members have been made, so it would seem that the Club is in an exceedingly active condition. Plans are in hand to recommence the monthly social evening meetings which were such a feature of pre-war days.

Australian Agar

Summary of its Qualities

A GOOD deal of research work has been employed in investigating the properties of agar-agar prepared from the Australian seaweed *Gracilaria confervoides*, which is being increasingly employed to replace material of Japanese origin. An extremely useful summary of its qualities, as compared with the Japanese material is contained in an article* published, by arrangement with the Secretary, Australian Scientific Research Liaison, in *Bull. Imp. Inst.* (1944, *42*, 2, 69).

Comparison with Japanese Product

For cultivation of micro-organisms in general, it is found, the Australian agar seems quite suitable. In comparison with Japanese agar it has the advantage of a remarkably tough and elastic structure which makes it very convenient for streaked plates. Its disadvantages, in decreasing order of importance, are the following:

1. Pronounced tendency to permit spreading growth of some bacteria, which renders its use difficult or even impossible for counting and isolation of bacteria from materials (*e.g.*, milk) where such spreading organisms are likely to be present, especially by means of poured plates. On streaked plates the tendency to spreading can in some measure be counteracted by cautious drying of the plates before use.

2. Setting-point of the melted agar at 48°C., which makes the medium inconvenient for the isolation of heat-sensitive bacteria by means of poured plates and precludes its use for routine bacterial counts in milk, using the standard technique.

3. A typical although vigorous growth of some bacteria, *e.g.*, the defective pigment-formation by *Ps. pyocyanea* and the "fuzzy" growth of several others on slopes—a point of some significance in the identification of bacteria.

4. High viscosity of melted agar, which makes the filtration, the pouring of plates and especially the mixing of blood-agar somewhat difficult. This property, as well as the tendency to spreading, can to some extent be remedied by further purification.

5. High content of available nutrients, probably including growth-compounds. This is a disadvantage only for specific purposes, such as nutritive studies or the isolation of nitrogen-fixing bacteria. In other cases it may be an actual advantage and may account for the remarkably good growth of the root-nodule bacteria of leguminous plants. For large-scale cultivation of the latter, Australian agar would seem highly satisfactory.

* By H. L. JENSEN, Macleay Bacteriologist, Linnean Society of New South Wales, Dept. of Bacteriology, University of Sydney, Australia.

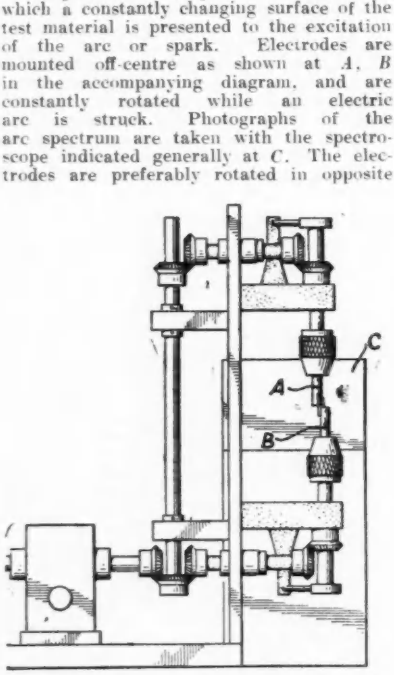
Tellurium in Iron

New Analytical Method

THE spectrochemical analysis of cast-iron containing small amounts of tellurium has been very difficult because the rarer element is quickly burned away, leaving its less readily vaporised associates. This same problem is met with in many other specific cases.

U.S. Patent No. 2,344,719, assigned by R. E. Nusbaum, *et al.*, to the General Motors Corporation, claims to surmount this difficulty, and is described by W. S. Hill in *J. Chem. Educ.* (1944, *21*, p. 377).

The patentees have provided a method in which a constantly changing surface of the test material is presented to the excitation of the arc or spark. Electrodes are mounted off-centre as shown at *A*, *B* in the accompanying diagram, and are constantly rotated while an electric arc is struck. Photographs of the arc spectrum are taken with the spectroscope indicated generally at *C*. The electrodes are preferably rotated in opposite



directions. They are disposed either with their axes parallel or at any angle between 0° and 180°.

The Japanese Government plans to construct two large paper factories in French Indo-China. One will use timber as its primary raw material, and the other will utilise such native material as rushes and bamboo. At present there is only one paper factory in the entire area, and it supplies only about one-ninth of the country's normal requirements.

Sodium Phosphate Solutions

Absorbents for Sulphur Dioxide

IN a Russian patent (M. N. Merlis, Pat. No. 48,244/1936) disodium phosphate solutions are suggested as absorbents for sulphur dioxide. At room temperature sulphur dioxide reacts with Na_2HPO_4 to form NaH_2PO_4 and sodium acid sulphite. At boiling point SO_2 is evolved; the equilibrium $Na_2HPO_4 + SO_2 + H_2O \rightleftharpoons NaH_2PO_4 + NaHSO_3$ is shifted to the left, so that the liberation of sulphur dioxide is practically complete.

In a recent Russian work (G. P. Luchinskii and P. M. Tavrovskaya, (*Russ. J. Appl. Chem.*, *13* 421) the absorption of sulphur dioxide at 20°C. has been determined quantitatively. The accompanying table shows

SOLUBILITY OF SULPHUR DIOXIDE (WEIGHT PER CENT.)

Partial pressure of SO_2	80	40	27	8
Conc. of Na_2HPO_4 (weight per cent.)		mm. Hg.		
0	1.32	0.68	0.46	0.14
2	2.7	1.7	1.1	0.9
4	3.9	2.6	1.7	1.4
6	5.1	3.7	2.5	2.1
8	6.2	4.6	3.2	2.7
10	7.4	5.5	3.8	3.4
12	8.4	6.4	4.5	3.9
16	10.8	7.8	5.8	5.1
20	12.9	8.9	7.1	6.3

the degree of improvement caused by addition of disodium hydrogen phosphate to water. The solubility of SO_2 is expressed in weight per cent. The partial pressure of SO_2 was varied between 8 mm. and 80 mm. of mercury, and the concentration of Na_2HPO_4 between 0 (pure water) and 20 weight per cent.

S.C.I. LONDON SECTION

The London Section of the Society of Chemical Industry opens its 1944-5 session on October 2 (*see* p. 310) when the chairman, Dr. R. T. Colgate (who is also one of the hon. secretaries of the Society), will deliver an address on the "Technics of Tin." The Section has a complete syllabus, with meetings on the first Monday of each month until May (inclusive). In view of the prospective reduction of black-out it is probable that meetings will be held at a later hour than has obtained in recent years, when they have willy-nilly been confined to the afternoon. The Section Committee has reviewed the position carefully, and a further statement will be made as soon as possible. Meanwhile, the first meeting has been fixed for 2.30 p.m.

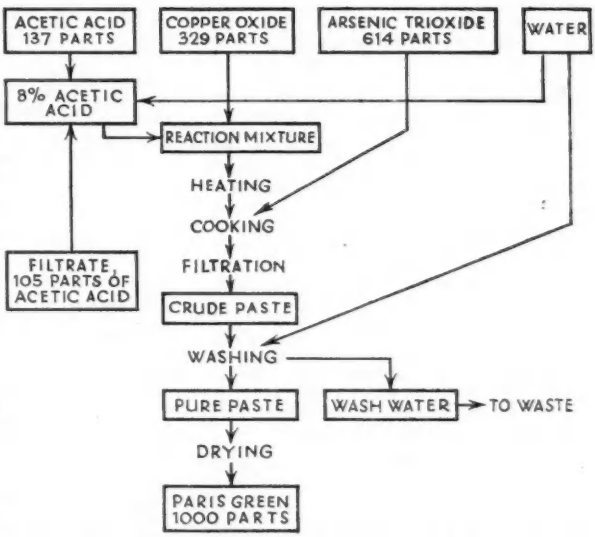
United States companies engaged in fish-oil production in Costa Rica are expanding in order to meet increasing demand for vitamin A.

Paris Green

A Novel Method of Manufacture

THE important insecticide, Paris green, known also as Schweinfurth green, is usually produced by dissolving white arsenic in soda lye and mixing the solution obtained with acetic acid and copper sulphate. $3\ As_2O_3 + 4\ Na_2CO_3 + 4\ CuSO_4 + 2\ CH_3CO_2H = 3\ Cu(AsO_2)_2.Cu(CH_3CO_2)_2 + 4\ Na_2SO_4 + 4\ CO_2 + H_2O$. G. P. Luchinskii and V. F. Churilkina (*Russian J. Appl. Chem.*, *13*, 367) have pointed out that this process wastes the whole of the soda employed which is converted into sodium sulphate and lost in the filtrate. They, therefore, devised another method in which no waste products appear and which has successfully passed the pilot-plant stage.

The chemical equation of the process is $4\ CuO + 3\ As_2O_3 + 2CH_3CO_2H = 3\ Cu(AsO_2)_2.Cu(CH_3CO_2)_2$, and its flow sheet is shown herewith. For the reaction to have a reasonable velocity, the amount of acetic acid must be twice as large as the theoretical, so that half of it remains in the first filtrate. To this filtrate sufficient concentrated acetic acid is added to make the solution up to the original strength (8 per cent.); it is then used for reacting with another batch of copper oxide.



As the new method uses copper oxide instead of copper sulphate, its purpose would be defeated by employing copper oxide produced by interaction of copper sulphate with an alkali. It has been found, however, that by heating copper powder in air at a temperature below 300°C. an oxide is formed which reacts with acetic acid at a satisfactory rate. Oxide formed at a higher temperature is not sufficiently active.

Theoretically, 1000 parts of Paris green are obtained from 314 parts of copper oxide, 586 parts of arsenic trioxide, and 118 parts of acetic acid. In practice, 236 parts of glacial acetic acid are mixed, in a pot provided with a reflux, with 2800 parts of water; 314 parts of copper oxide are added, the mixture is heated to boiling, and in the boiling liquid 586 parts of finely ground arsenic trioxide are introduced with continuous stirring. Two hours of cooking follow. After cooling for one hour, the mixture is filtered. The filtrate contains some copper and arsenic which must be taken into account when the filtrate, after addition of more acetic acid, is used for the next batch.

In laboratory experiments 1000 parts of dry Paris green have been obtained from 329 parts of copper oxide, 614 parts of arsenic trioxide, and 137 parts of acetic acid. In a pilot plant trial 326 parts of copper oxide, 602 parts of arsenic trioxide, and 132 parts of acetic acid were spent. An even higher yield is expected when regular production is attained.

The Standard Chemical Company, of Troy, Alabama, is to rebuild its sulphuric acid plant, largely destroyed by a tornado last spring. Mills-Packard water-cooled chambers embodying the most recent features and capable of operating at from 2.5 to 3 cu. ft. of chamber space per lb. of sulphur burned per day, will be one of the main features of the new plant.

Filter Aids

Applications of Diatomaceous Earth

MODERN research in diatomaceous earth has led to revolutionary advances in many industrial filtering processes. For here, specially prepared and adapted fossil remains of the tiny marine plants known as diatoms have given spectacular results as filter-aids over a wide range of industrial applications. As a raw material, diatomaceous earth has no unusual chemical properties; essentially, it is an amorphous, hydrated silica, mineralogically classified as opal. But it does possess physical properties which are both valuable and unique. The physical structure of the diatom particles—the almost unbelievable thinness, diversity, and intricacy of these microscopic forms—is the fundamental source of these properties. It is this structure that gives diatomaceous earth its finished forms extremely high porosity (up to 90 per cent. by volume of minute air cells); its immense absorptive capacity (up to three to four times its weight of liquid in powdered form); and its exceptionally low thermal conductivity, among other unusual properties.

In its particular application as a filter-aid, diatomaceous earth is used as follows: filter-aid powders, being chemically inert, are mixed with the solutions to be filtered and, as this solution passes through the filter the powder collects on the filter membrane and forms a porous cake with openings hundreds of times finer than the finest mesh. Passage of the liquid through this porous cake, which is formed continuously as the filtration proceeds, greatly speeds up filtration and results in far greater clarity in the filtered liquid than is obtainable by other filtering processes. The filter-aid also prevents clogging of the filter cloth or screen, which now becomes merely a support for the cake.

Pressure Filters

Diatomaceous earth filter-aids are most widely used in connection with pressure filters. In such operations, filtration is ordinarily accomplished by forcing the liquid under pressure through a cloth or screen. In theory, the liquid should pass through the openings of the filter cloth, leaving the impurities on the cloth. Actually, in many cases, while the finer suspended solids pass with the liquid through the comparatively coarse openings in ordinary filter cloth, the larger particles remain behind on the cloth to clog the openings, smear the cloth, and slow down or entirely stop the flow through the filter press.

Particularly are such difficulties brought out in what are described as "clarification filtrations" where the particles to be removed are non-rigid, slimy, or colloidal in size. This type of filtration problem occurs with oils, sugar, syrups, cereal beverages, and similar products. In these filtration processes, unless filter-aids are used, the gelatinous, finely-divided, suspended matter cannot be completely removed. Even an indifferent clarification cannot be accomplished economically unless filter-aids are employed. Finely-divided, porous, and light in weight, these filter-aids are inert and do not affect the chemical or physical characteristics of the filtrate. Low specific gravity assures suspension during the filtration process, with consequent brilliant clarity of filtrates, and long filtering cycles.

Special Grades

To the advantages of perfect clarity, improved keeping qualities, and generally enhanced finished product, diatomaceous silica filter-aids now on the market in a wide variety of specially-prepared grades offer to the user important manufacturing economies. A number of standard grades have been perfected to provide the most efficient relationship between the filtering rate of flow of various products and their clarity after filtration. These have widely different flow rates for non-viscous, semi-viscous and viscous liquids, ranging from about 5 to 110 gallons per sq. ft. of filtering area in 3 hours.

The right quantity of filter-aid to be added to a solution depends more upon the nature than upon the quantity of impurities suspended in it. Sufficient must be used as a rule to envelop the particles completely so that a filter cake of required porosity may be obtained. The percentage required to provide maximum clarification, satisfactory flow rates, and protection for cloths varies usually from 0.10 to 0.5 per cent. of the weight of the liquid.

Not only is the cost of filter cloth and labour greatly reduced in almost every case, but in many instances steam and power consumption also can be substantially lowered. Thanks to the increased capacity that filter-aids impart to the filtration equipment, overhead factory unit production cost is often brought down to a minimum.

A new fuel tablet has been developed by the U.S. Quartermaster corps in collaboration with the Office of Scientific Research and Development. It is made from trioxane, coloured to distinguish it as non-edible. Its weight is little more than an ounce and a stew can be heated in seven minutes.

First Aid for Industrial Accidents

A Useful Handbook Reviewed

by JOHN CREEVEY

FOR the better first-aid treatment of factory accidents we have learned much by our experience of casualties suffered as the result of enemy air attacks upon this country. *Casualty Work for Advanced First Aid Students*, by A. W. Macquarrie (E. & S. Livingstone, Edinburgh, 4s. 6d.) provides ample evidence of this, and the book in appropriate parts is commended as good reading not only for those directly concerned with the welfare of the works staff, but also for all who are engaged in industry and may be present when fellow-workers suffer injury. No works should lack an adequate number of persons (proportional to the size of the works) who are fully qualified to render first aid in the event of accidents, and the larger the number of persons on the staff who possess that experience, the better it is for all concerned.

Interesting Reading

The book to which reference is made is so small and compact that it may be carried about continuously for study as spare moments occur in the course of daily routine; it measures only 4 in. by 5 in., and is but half-an-inch thick. It is further recommended that five minutes' reading in it be done once every day, for the amount of useful knowledge that can be acquired by such a self-inflicted course of study will certainly surprise those who follow this suggestion of the reviewer. The task of regular reading will be unexpectedly pleasant, for the author's style is distinct from that normally found in first-aid manuals. The book was written with the intention of supplementing the knowledge of those already qualified in "first aid," but its usefulness will prove wider than that. The underlying principles are the same as those taught in the recognised manuals, but the presentation of facts is somewhat different and is certainly made more interesting. Throughout, three points are stressed; the immediate control of hæmorrhage; the immobilisation of badly damaged tissues; and the need for quick delivery to the care of the surgeon.

Under "blitz" conditions the casualty may be covered with soot and dirt, perhaps unconscious and suffering from multiple injuries; darkness or dark situations may add to the difficulty of giving immediate attention. This may well apply also in the case of a serious factory accident, involving an explosion. The author reminds us that the aim of every "first aider" is to save life, and to further this object various measures have to be adopted. The casualty has to be removed from any situation involving further danger; there must be relief of hæmorrhage, pain, or shock; and means must be adopted to prevent the aggravation of injury. To do this properly, involving the minimum of subsequent danger, there must first of all be an accurate and rapid diagnosis; quick diagnosis, in turn, depends upon correct examination technique with a sound knowledge of elementary anatomy and physiology, and of the signs and symptoms of the various conditions that may be seen. The person giving first aid must be able to tell if the casualty is dangerously ill; is hurt, but not seriously; or is merely knocked out, or badly shaken.

The eliciting of symptoms is sometimes difficult, even though simple questions, like "Where are you hurt?", can give much of the information required. Symptoms are the actual feelings experienced by the casualty as a direct result of the accident, such as pain, coldness, loss of sensation, and similar conditions of which the casualty (if conscious) is aware and which he can describe. But, it must be remembered that the casualty usually describes the symptom which appears most important to him, and this is not necessarily the one which is of most significance to the person giving first aid. Therefore, diagnosis should never be made entirely upon symptoms as described.

Pain is the most important of all symptoms, as regards being described. Pain, however, depends upon nerve distribution, and when a nerve trunk is severed or damaged, pain may be felt in some region of the body apparently unrelated to the injury, as when damage to a nerve in the thigh or shoulder may cause the casualty to complain of severe pain in the foot or the hand; likewise, damage to a hip joint may cause pain in the knee.

Signs to be Noted

As to the general condition of the casualty, there are certain signs which should (with experience) come to be noted automatically, and which decide any question of priority of attention or removal to hospital. The pulse, for instance, is altered to some extent by every unusual experience, whether physical or emotional; it must be noted whether it is fast or slow, full or feeble, regular or irregular. The typical hæmorrhagic pulse is regular at first; but increases in rapidity and decreases in volume; the pulse of a person suffering badly from shock is often irregular as well as extremely rapid and flat. The state of the pulse may be the first indication of some

serious condition approaching, perhaps a concealed hæmorrhage. Every injury also has its characteristic breathing; the points to be noted are rate, range, and rhythm. Shallow breathing, sometimes irregular, is associated with shock, fainting, or concussion; there is gasping in the case of severe hæmorrhage; deep stertorous breathing indicates cerebral compression; sharp, catchy breath comes with fractured ribs or severe abdominal injury. The colour, temperature, and degree of moisture of the skin all have something to indicate, for the state of the skin varies with the state of blood circulation and is therefore affected by every condition which influences it.

The author covers each aspect of his subject conscientiously and clearly. He describes a rapid but efficient method of making a routine examination of the casualty; he tells us of the nature of different types of wound, and of the treatment (as regards first aid) which each calls for. There is a chapter dealing with hysteria and shock; others devoted to hæmorrhage; asphyxia; the unconscious casualty; and last of all, transport. "The process which begins with the removal of a casualty from the scene of his injury and ends with his subsequent delivery to the care of the surgeon is not a casual affair that can be carried out by just anybody who happens to be present, but is a very expert job which deserves all the care and training that is possible." This book will tell you all that you need to know of its subject, if you read it thoroughly and take small regular doses of the knowledge.

A CHEMIST'S BOOKSHELF

COAL-TAR FUELS. Ed. J. S. Sach. London: Association of Tar Distillers. Pp. 140. 15s.

The technical problems involved in the handling of coal-tar fuels are greater than, for example, the problems involved in the handling of coal. In order to provide a sound basis of data for engineers who wish either to purchase or design equipment, this book has been brought together.

The major difficulty in handling coal-tar fuels is their viscosity. This may be reduced by raising the temperature, a practice which is necessary in many cases either for pumping or atomisation. The fuels are specified or graded according to the temperature needed for the viscosity for efficient atomisation. This scale of "equiviscous temperatures" gives the basis of nomenclature which is the following: Coal-Tar Fuel 50, C.T.F. 100, C.T.F. 200, C.T.F. 250, C.T.F. 300, and C.T.F. 400, where the figures represent the temperature in Fahrenheit degrees at which the particular material is suitable for atomisation. In order to obtain reliable values for the viscosity of the fuels special determinations were made, in absolute values, by work carried out in the laboratories of the South Metropolitan Gas Company. The figures obtained have been set out in a convenient nomogram.

The general methods employed for storage and transport are discussed and recommendations are made with regard to lagging and tank heating, using steam or electrical immersion heaters. Here there are given reliable ratings for heat transfer. On the mechanical side information is given on suitable types of pumps for the different duties, and the varieties of burners are studied in some detail.

The melting of pitch is the subject of a special section and designs are given with the outputs that can be expected from the various designs. The processing of hard pitch to form pulverised fuel, and the methods of feeding, with desirable air velocities and designs of pipe line, conclude the sections dealing with the handling of coal-tar fuel. There is, however, a final section which discusses the calculation of heat transfer, and a set of appendices giving data on cooling, air requirements, and pipe friction.

This book thus brings together authoritative data and methods dealing with a fuel which has tended to be somewhat troublesome in the past. Such a new and compact source of information should help considerably in the design of new plant and the overcoming of difficulties in existing equipment.

Teepol

New Petroleum By-Product

THE production from petroleum by-products of a new surface-active compound, which possesses many of the characteristic properties of soap, has been achieved by the Shell Group after several years of intensive research, leading eventually to the construction, in this country, of a large plant for the production of higher secondary alkyl sulphates. The new product is marketed under the name of "Teepol" and is in full supply.

The manufacture of Teepol involves the cracking of the base material to produce a mixture of olefines, a selected cut of which, corresponding to the C_{10}-C_{18} range, is sulphated and neutralised, followed by special extraction and purification methods. Teepol is the first example of a synthetic detergent of the alkyl sulphate type to be manufactured on a large scale in Britain, and its production is an important contribution to the national economy in fats. It is soluble in water and is ionised in solution. For many purposes in the textile and laundry industries, this new product can replace soap completely, in other cases partial replacement of soap results in increased efficiency. In engineering it can be used in electro-deposition, acid pickling, aqueous degreasing, and as an additive to fluxes of the zinc chloride type. It is used in the manufacture of leather, paper, paints, disinfectants and insecticides, and is manufactured and distributed in the U.K. by Technical Products, Ltd.

Applied Photography

The Kodak Data Book

A NUMBER of new data sheets for this book have recently been issued. These include A.37, which deals with photography in the tropics, and A.38, which describes methods of copying radiographs. In the latter sheet detailed instructions are given for producing a "positive image" from the radiograph and "negative image," either as a paper print or as a facsimile The methods described, will, of course, apply equally well to transparencies other than radiographs. Sheet A.39 is an extremely useful 10-page booklet dealing with the selection of materials for the construction of photographic processing material. The action of photographic chemicals on such materials as metals, impregnated woods, porcelain, and synthetics is fully described and many suggestions are made for the selection of suitable apparatus. A new film for colour photography by artificial light, Kodachrome Type A, and the method of handling it are described in sheet A.40. The various methods for transferring lettering and other markings by purely photographic processes to instrument dials and panels, in cases where metal etching is not practicable, are described in sheet D.11. In addition the Index and the Formulary (W.1) have been revised; and there have been slight revisions in sheet A.29, which deals with the processing of radiographs and in sheet W.28, which contains formulæ for Metol-free developers.

INDUSTRIALISATION IN CHILE

Chile has drawn up a vast programme for a national chemical industry with the assistance of Mr. Concannon, chief of the Chemical Division, U.S. Department of Commerce, who made a survey of the country's chemical industry lasting over eight months. As a result of his survey a chemical division has been established in the Government-owned Corporación de Fomento in order to carry out the programme as part of Chile's industrialisation plan. First of all, production of sulphuric acid, caustic soda, soda ash, and coal tar products in quantities sufficient to cover domestic needs is envisaged. Development of forestry resources is to yield methanol, acetic acid, turpentine and rosin, eucalyptus oil and tannic acid. In addition, the production of vitamins from fish oil is being planned on a large scale and fish waste is to be used in the manufacture of fertilisers. At a later stage, dyestuffs and pharmaceuticals are to be based on coal-tar distillation. Large quantities of sulphur-containing pyrites, which in the past were discarded by the copper mines, are also to be utilised.

Personal Notes

DR HAROLD MOORE, who was appointed director of the British Non-Ferrous Metals Research Association in 1932, is to retire on October 31.

MR. LOUIS BOK has been elected president of the Chemical, Metallurgical, and Mining Society of South Africa, in succession to Professor C. Biccard Jeppe.

DR. JAKOB BÜCHI, director of the research department of Dr. Wander A.G., Berne, has been appointed Professor of Pharmaceutical Chemistry at the Federal Technical University of Zürich.

SIR GERALD BRUCE, senior Regional Commissioner for Wales was, on September 18, appointed chairman of the new South Wales and Monmouthshire Industries Association, which has been formed for the purpose of fostering existing industries and attracting new ones.

Pending the publication of the Alness Committee report dealing with the future of Scottish agricultural colleges, the governors of the West of Scotland Agricultural College, Glasgow, have made a number of interim appointments, resultant upon the retirement of the Principal, Dr. W. G. R. Paterson, and other resignations and retirements. Among the principal appointments is that of PROFESSOR D. N. MACARTHUR, D.Sc., F.R.I.C., of the chemistry department, who is to be interim director of research, with effect from October 1.

Obituary

SIR THOMAS MILLER-JONES, who died at Warnham, Sussex, on September 15, aged 76, was chairman and governing director of Thomas Hill-Jones, Ltd., Bow Common Lane, London, E. He was a son of Mr. Thomas Hill-Jones, founder of the firm, and was a member of the Grand Council of the Federation of British Industries.

DR. WERNER BLEYBERG, the well-known oil chemist, died on September 8 in London, aged 48, after a long and serious illness. In 1923-32 he was assistant to Professor D. Holde, the international expert on oils and fats, and during this time he also served as a lecturer at the Technical High School, Berlin-Charlottenburg. Dr. Bleyberg brought out a number of publications on fats and oils and also edited the 7th edition of Professor Holde's *Kohlenwasserstofföle und Fette* (1933). Since 1933 he had been working with Franks Laboratories, first in Berlin, up to 1938, and since then in London, where he interested himself not only in hydrocarbon oils but also in the chemistry of artificial resins.

Reinstatement of Workers

Employers' Obligations

THE Reinstatement in Civil Employment Act, 1944, shows what is required of an employer when a former employee returns to civil life after service in the Forces, and applies also to those persons who, called up for similar service, were enrolled by the National Service Act, 1941, in a Civil Defence Force.

The employer is called upon to reinstate the returned person in the occupation in which he was last employed before joining up and on terms and conditions as good as those which would have applied had he not gone into the Forces: if, however, it is not reasonable and practicable to re-employ the returned person in that occupation the employer fulfils the obligation by providing employment in the most favourable occupation and on the most favourable terms and conditions which are reasonable and practicable in regard to the returned person.

The Guiding Principle

The phrase "reasonable and practicable" is really the guiding principle of the obligation, and the Act specifically provides that the employer is not called upon (it not being reasonable and practicable) to dismiss an employee to carry out the obligation, who was employed before the returned person joined up, was of longer service at that date, and was in employment as permanent in character as that of the person who joined up. But it is shown that it is reasonable and practicable to dismiss any person not of the qualifications just mentioned, and this applies whether that person comes under the Act or not. To clarify the position further, suppose a person engaged to take an employee's place on joining the Services afterwards also joins up: both are under the Act, but the person first joining the Forces has prior claim to reinstatement on return to civil life, and the employer is not required to re-engage the second person on his return, if it is not reasonable and practicable to do so. Suppose, again, that the second person to go into the Forces returns before the first person who joined up, and is taken back into employment. When the first person does come back he must be re-engaged, but the other returned person is not necessarily dismissed if it is reasonable and practicable to employ him: if however the employer has no suitable job available he is within the law by dismissing him as it is not reasonable and practicable to employ him.

The returned employee, if he wants to return to his pre-Service employer, must apply to the firm or through an Employment Exchange (this is not necessary if the employer has arranged for his return), and he is allowed until the fifth Monday after Service discharge to do this; the employer must be told when he will be ready to restart and this must be done within four weeks of the end of the application period. Thus a returned person has roughly eight weeks after leaving the Services before restarting civil work.

Employment must be provided at the first opportunity (after the date for restarting given by the returned person) at which it is reasonable and practicable for the employer to do so; the obligation to re-employ, however, is a continuing one if the returned employee renews his application every 13 weeks. This is useful where the firm may be one under the Concentration of Industries scheme. After re-engagement, employment must run for 26 weeks or as much of this period as is reasonable and practicable; if the returned person had been employed for 52 weeks or more before joining up, then 52 weeks applies instead of 26 weeks.

Reinstatement Committees will be formed to settle questions between employers and returned employees, and if a Committee finds that an employer is at fault as regards the Act, an Order can be issued that employment be found and/or an Order providing for the payment of compensation for any loss suffered by the returned employee, such sum however not to exceed the amount to which he would have been entitled if the obligation of the Act had been properly discharged.

SILICON CARBIDE

A correspondent of *The Times Trade and Engineering* refers to the confusion that seems to have arisen regarding proprietary names of both silicon carbide and oxycarbide (or carboxide) which have appeared at various times. Crystalon is one name for the carbide, Silite is a carbide containing some carboxide, while Siloxicon, the manufacture of which was patented by Acheson in 1903, seems to be a solution of silica in the carbide. Carborundum firesand is a grey by-product forming the core of the carbide furnace and is a common material on the American market for rammed-up linings, refractory cements and furnace linings. It is formed at about 1600°C., and would be converted into carbide if the temperature were taken to 1850°C. Silfrax is yet another form of the carbide produced by passing silicon vapour over solid carbon; it is formed in the carbide furnace and separated from the main product. Tough crystals of the carbide are thus formed on the carbon surface, and the material, like the carbide itself, is suitable for pyrometer tubes. Silundum was introduced after 1900, when it was shown that on heating pressed or moulded carbon in a mixture of silicon carbide and sand, the silica vaporises and forms a resistant body with the shaped carbon article. Although carbides of zirconium, titanium, boron, and other elements have been the subjects of much research, silicon carbide maintains its high place in improved refractories and heating elements as well as in abrasives.

New Control Orders

Fertilisers in Scotland

THE Minister of Supply in consultation with the Secretary of State for Scotland has made the Control of Fertilisers (No. 28) (Potash) (Scotland) Order, 1944 (S. R. & O. 1944, No. 1046), which revokes the Control of Fertilisers (No. 26) Order, 1942. The new Order provides that potash may be distributed in Scotland only under the conditions specified in the Potash Fertiliser (Acquisition and Rates of Application) (Scotland) Order, 1944, made by the Secretary of State for Scotland. Both Orders came into force on September 14.

Exemption from K.I.D.

The Treasury has made the safeguarding of Industries (Exemption) No. 4 Order, 1944 (S. R. & O. 1944, No. 928) under Section 10 (5) of the Finance Act, 1926, exempting from Key Industry Duty emetine, emetine bismuth iodide, emetine hydrobromate, and emetine hydrochlorate. The Order is effective from September 13, 1944, until June 30, 1945.

Naphthalene Prices

The Coal Tar Products Prices (No. 2) Order, 1944 (S. R. & O. 1944, No. 1051), effective from September 22, provides for an increase in the prices of naphthalene of all grades—crude, hot-pressed, crystal, powder, ball, and flake—above the prices quoted in Schedules 2, 4, 5, and 6 of the Coal Tar Products Prices Order, 1943. It also provides for an increase in respect of the supply of hot-pressed naphthalene where the material is produced at premises other than those at which the crude naphthalene used in its production was produced. Some details of the altered prices will be found on p. 307.

U.S. Copper

Relaxation of Restrictions

IN 1943, as a result of the joint effort of Government, industry, and labour, the U.S. copper position ceased to be critical, according to a survey published by the Bureau of Mines. However, little metal was available to ease the restrictions on consumption for any but war purposes and the most essential civilian needs. Nevertheless, there was a tendency, in the last months of 1943 and early this year, to withdraw some of these restrictions. The relaxations affected only highly essential civilian goods, where the use of copper and copper alloys provided a saving in manpower, or where substitute materials had proved unsatisfactory. In no case were substantial quantities involved. The easier situation was due, in the main, to reductions in the output of small arms. The substitution, on a large scale, of steel for brass in cartridge cases was abandoned at the end of last year, brass supplies having increased materially and enabled the army to return to the use of brass for this purpose.

Mine production totalled 1,090,818 short tons, against 1,080,061 in 1942 and 958,149 in 1941. Smelter output amounted to 1,092,939 short tons, compared with 1,087,991 and 966,072 in 1942 and 1941, respectively. Total domestic refinery production, which rose from 1,395,309 short tons in 1941 to 1,414,561 in 1942, fell to 1,379,263 in 1943. Throughout these three years, New York copper prices averaged 11.87½ cents per lb., exclusive of bonus payments of the Metal Reserve Co. in 1942-43.

BORAX MONOPOLY ALLEGED

Indictments have been secured by the U.S. Department of Justice, from a Federal grand jury in San Francisco, against certain companies and individuals for alleged breach of the anti-trust laws. The allegation is that the defendants—Borax Consolidated, Ltd., of London, the American Potash and Chemical Corporation, and their subsidiaries, as well as various business men in London, New York, and California—monopolised, through a cartel, the world supply of borax. The German members of the cartel, who according to the Government attorneys, own 90 per cent. of the American company, were not indicted, as their shares were taken over by the alien property custodian when the German ownership was discovered—nearly a year after the United States entered the war.

Since the above report was published, Borax Consolidated, Ltd., have issued a statement to the effect that, in fact, no such monopoly was ever obtained, since at all times there were numerous independent sources of supply of crude materials and refined products and competition has always existed in world markets. Since the outbreak of war the borax industry in Britain has been controlled by the Ministry of Supply; in America, since that country entered the war, prices have been limited, by control, to the pre-war ceiling.

It is not alleged that any German or other enemy interest existed at any time in Borax Consolidated, Ltd., or its subsidiary companies or that, since the outbreak of war, there has been any trading with the enemy; there could be no foundation for any such allegations. Since the outbreak of war Borax Consolidated, Ltd., and its subsidiary companies, both in this country and America, have assisted the war effort to the maximum extent, and the American subsidiary has received the Army and Navy "E" award for services rendered.

Prices of British Chemical Products

STEADY conditions have prevailed in the chemical market during the past week and a moderate weight of fresh inquiry has been in circulation. The delivery of heavy chemicals to the chief consuming industries is reported to be satisfactory and prices generally remain unchanged, with the exception of copper sulphate, where an advance of £1 per ton is recorded; the current quotation is £32 5s. per ton, f.o.b., less 2 per cent., in 2 cwt. bags. In the soda products section there is a steady inquiry for soda ash, Glauber salt, and salt cake, while offers of bichromate of soda and the hyposulphites of soda are quickly absorbed. Nitrate of soda is a good market and percarbonate of soda is in moderate demand. Scarcity of supplies is the chief feature of the potash market and prices remain unaltered. Quiet conditions continue in the coal-tar products market, with creosote oil, and crude carbolic acid steady. A fair trade is passing in pyridine.

MANCHESTER.—Traders on the Manchester chemical market during the past week have reported a steady flow of delivery specifications for the leading heavy products, including textile chemicals, against orders already on the books. There has also been a fair amount of new inquiry in the market and this has resulted in additional business, some of it covering estimated requirements up to the end of the year. A strong undertone as regards prices is generally reported. Toluol and benzol and other light distillates are active sections of the tar products market.

GLASGOW.- In the Scottish heavy chemical trade, there has been an improvement during the past week for home business. Export inquiries, however, still remain rather restricted. Prices keep very firm at previous levels.

Price Changes

Rises.—Copper sulphate; naphthalene.

General Chemicals

Acetic Acid.—Maximum prices per ton: 80% technical, 1 ton £39 10s.; 10 cwt./1 ton, £40 10s., 4/10 cwt., £41 10s.; 80% pure, 1 ton, £41 10s.; 10 cwt./1 ton, £42 10s.; 4/10 cwt., £43 10s.; commercial glacial, 1 ton, £49; 10 cwt./1 ton, £50; 4/10 cwt., £51; delivered buyers' premises in returnable barrels, £4 10s. per ton extra if packed and delivered in glass.

Acetone.—Maximum prices per ton, 50 tons and over, £65; 10/50 tons, £65 10s.; 5/10 tons, £66; 1/5 tons, £66 10s.; single drums, £67 10s.; delivered buyers' premises in returnable drums or other containers having a capacity of not less than 45 gallons each. For delivery in non-returnable containers of 40/50 gallons, the maximum prices are £3 per ton higher. Deliveries of less than 10 gallons free from price control.

Alum.—Loose lump, £16 per ton, f.o.r.

Aluminium Sulphate.—Ex works, £11 5s. per ton d/d.

Ammonia, Anhydrous.—1s. 9d. to 2s. 3d. per lb.

Ammonium Carbonate.—£37 10s. to £38 per ton d/d in 5 cwt. casks.

Ammonium Chloride.—Grey galvanising, £22 10s. per ton, in casks, ex wharf. Fine white 98%, £19 10s. per ton. See also Salammoniac.

Antimony Oxide.—£111 to £117 per ton.

Arsenic.—99/100%, under 1 ton, £62; 1 ton, £61; white 98/99%, £59; grey 96/97%, £54; grey 95/96%, £52; crude, £35 per ton.

Barium Carbonate.—Precip., 4-ton lots, £18 per ton d/d; 2-ton lots, £18 5s. per ton.

Barium Chloride.—98/100%, prime white crystals, £17 10s. to £19 10s. per ton, bag packing, ex works.

Barium Sulphate (Dry Blanc Fixe).—Precip., 4-ton lots, £18 15s. per ton d/d; 2-ton lots, £19 10s. per ton.

Bleaching Powder.—Spot, 35/37%, £11 to £11 10s. per ton in casks, special terms for contract.

Borax.—Per ton for ton lots, in free 1-cwt. bags, carriage paid: Commercial, granulated, £34; crystals, £35; powdered, £35 10s.; extra fine powder, £36 10s. B.P., crystals, £43; powdered, £43 10s.; extra fine, £44 10s. Borax glass, per ton in free 1-cwt. waterproof paper-lined bags, for home trade only, carriage paid: lump, £84 10s.; powdered, £85 10s.

Boric Acid.—Per ton for ton lots in free 1-cwt. bags, carriage paid: Commercial, granulated, £62; crystals, £63; powdered, £64; extra fine powder, £66. B.P., crystals, £71; powder, £72; extra fine, £74.

Calcium Bisulphide.—£6 10s. to £7 10s. per ton f.o.r. London.

Calcium Chloride.—70/72% solid, £5 15s. per ton, ex store.

Charcoal, Lump.—£15 to £16 per ton, ex wharf. Granulated, supplies scarce.

Chlorine, Liquid.—£23 per ton, d/d in 16/17 cwt. drums (3-drum lots).

Chrometan.—Crystals, 5½d. per lb.

Chromic Acid.—1s. 5d. per lb., less 2½%, d/d U.K.

Citric Acid.—Controlled prices per lb., d/d buyers' premises. For 5 cwt. or over, anhydrous, 1s. 6¾d., other, 1s. 5d.; 1 to 5 cwt., anhydrous, 1s. 9d., other, 1s. 7d. Higher prices for smaller quantities.

Copper Oxide.—Black, powdered, about £100 per ton.

Copper Sulphate.—£32 5s. per ton, f.o.b., less 2%, in 2 cwt. bags.

Cream of Tartar.—100 per cent., per cwt., for 10 cwt., or more, £14 11s. 6d.; 5 to 10 cwt., £14 12s. 6d.; 2 to 5 cwt., £14 13s. 6d.; 1 to 2 cwt., £14 14s. 6d., d/d in sellers' returnable casks. Less than 1 cwt., 2s. 8d. to 2s. 10d. per lb. d/d. Maximum controlled prices.

Formaldehyde.—£25 to £27 15s. per ton in casks, according to quantity, d/d.

Formic Acid.—85%, £47 per ton for ton lots, carriage paid; smaller parcels quoted up to 50s. per cwt., ex store.

Glycerine.—Chemically pure, double distilled 1260 s.g., in tins, £4 to £5 per cwt., according to quantity; in drums, £3 19s. 6d. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hexamine.—Technical grade for commercial purposes, about 1s. 4d. per lb.; free-running crystals are quoted at 2s. 1d. to 2s. 3d. per lb.; carriage paid for bulk lots.

Hydrochloric Acid.—Spot, 7s. 6d. to 8s. 11d. per carboy d/d, according to purity, strength and locality.

Hydrofluoric Acid.—59/60%, about 1s. to 1s. 2d. per lb.

Iodine.—Resublimed B.P., 10s. 4d. to 14s. 6d. per lb., according to quantity.

Lactic Acid.—Pale tech., £57 per ton; dark tech., £50 per ton ex works; barrels returnable.

Lead Acetate.—White, 50s. 6d. to 52s. 6d. per cwt. MANCHESTER: £51 to £54 per ton.

Lead Nitrate.—About £47 per ton d/d in casks.

Lead, Red.—English, 5/10 cwt., £45 per ton; 10 cwt. to 1 ton, £44 15s.; 1/2 tons, £44 10s.; 2/5 tons, £44; 5/20 tons, £43 10s.; 20/100 tons, £43; over 100 tons, £42 10s. per ton, less 2½%, carriage paid. Non-setting red lead, 10s. per ton dearer in each case.

Lead, White.—Dry English, less than 5 tons, £57; 5/15 tons, £53; 15/25 tons, £52 10s.; 25/50 tons, £52; 50/200 tons, £51 10s. per ton, less 5% carriage paid. Ground in oil, English, 5/9 cwt., £69; 10 cwt., £68 10s.; 1/2 tons, £67 10s.; 2/5 tons, £66; 5/10 tons, £64; 10/15 tons, £63; 15/25 tons, £62 10s.; 50/100 tons, £61 10s. per ton, less 5% carriage paid.

Litharge.—1 to 2 tons, £44 10s. per ton.

Lithium Carbonate.—7s. 9d. per lb. net.

Magnesite.—Calcined, in bags, ex works, £18 15s. to £22 15s. per ton.

Magnesium Chloride—Solid (ex wharf), £22 per ton.

Magnesium Sulphate.—Nominal.

Mercury Products.—Controlled price for 1-cwt. quantities: Bichloride powder, 15s. 8d.; bichloride lump, 16s. 3d.; mercury oxide, red cryst., 20s. 9d.; red levig., 20s. 3d.; red tech., 19s. 11d.; yellow levig., 20s. 2d.; yellow tech., 19s. 7d.; sulphide, red, 17s. 9d.

Methylated Spirit.—Industrial 66° O.P. 100 gals., 2s. 4d. per gal.; pyridinised 64° O.P. 100 gals., 2s. 5d. per gal.

Nitric Acid.—£24 to £26 per ton, ex works.

Oxalic Acid.—£60 to £65 per ton for ton lots, carriage paid, in 5-cwt. casks; smaller parcels would be dearer; deliveries slow.

Paraffin Wax.—Nominal.

Potash, Caustic.—Solid, £65 10s. per ton for 1-ton lots; flake, £73 per ton for 1-ton lots. Liquid, d/d, nominal.

Potassium Bichromate. — Crystals and granular, 7¼d. per lb.; ground, 8¼d. per lb., for not less than 6 cwt.; 1-cwt. lots, ½d. per lb. extra.

Potassium Carbonate.—Calcined, 98/100%, £67 5s. per ton ex store; hydrated, £61 10s. per ton.

Potassium Chlorate.—Imported powder and crystals, nominal

Potassium Iodide.—B.P., 8s. 8d. to 12s. per lb., according to quantity.

Potassium Nitrate.—Small granular crystals, 76s. per cwt. ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 10d. per lb. for 1 cwt. lots; for 3 cwt. and upwards, 1s. 9½d. per lb.; technical, £7 18s. 6d. to £8 10s. 6d. per cwt., according to quantity d/d.

Potassium Prussiate.—Yellow, nominal.

Salammoniac.—First lump, spot, £48 per ton; dog-tooth crystals, £50 per ton; medium, £48 10s. per ton; fine white crystals, £19 10s. per ton, in casks, ex store.

Soda, Caustic. — Solid 76/77%; spot, £16 7s. 6d. per ton d/d station.

Sodium Acetate.—£41 per ton, ex wharf.

Sodium Bicarbonate.—Refined, spot, £11 per ton, in bags.

Sodium Bichromate.—Crystals, cake and powder, 6½d. per lb.; anhydrous, 6¼d. per lb., net, d/d U.K.

Sodium Bisulphite. — Powder, 60/62%, £19 10s. per ton d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—£21 per ton d/d in minimum ton lots in 2 cwt. free bags.

Sodium Chlorate.—£36 to £42 per ton, nominal.

Sodium Hyposulphite.—Pea crystals, £21 10s. per ton for 2-ton lots; commercial, £15 per ton.

Sodium Iodide.—B.P., for not less than 28 lb., 9s. 11d. per lb., for not less than 7 lb., 13s. 1d. per lb.

Sodium Metasilicate.—£16 10s. per ton, d/d U.K. in ton lots.

Sodium Nitrite.—£20 to £23 10s. per ton for ton lots.

Sodium Percarbonate.—21½% available oxygen, £7 per cwt.

Sodium Phosphate.—Di-sodium, £26 10s. per ton d/d for ton lots. Tri-sodium, £27 10s. per ton d/d for ton lots.

Sodium Prussiate.—9d. to 9½d. per lb. ex store.

Sodium Silicate.—£6 to £11 per ton.

Sodium Sulphate (Glauber Salt).—£4 10s. per ton d/d.

Sodium Sulphate (Salt Cake).—Unground. Spot £4 11s. per ton d/d station in bulk. MANCHESTER: £4 15s. per ton d/d station.

Sodium Sulphide. — Solid, 60/62%, spot, £18 5s. per ton, d/d, in drums; crystals, 30/32%, £12 7s. 6d. per ton, d/d, in casks.

Sodium Sulphite.—Anhydrous, £29 10s. per ton; pea crystals, £20 10s. per ton d/d station in kegs; commercial, £12 to £14 per ton d/d station in bags.

Sulphur.—Per ton, ground, £15-£16.

Sulphuric Acid.—168° Tw., £6 10s. to £7 10s. per ton; 140° Tw., arsenic-free, £4 11s. per ton; 140° Tw., arsenious, £4 3s. 6d. per ton. Quotations naked at sellers' works.

Tartaric Acid.—Per cwt., for 10 cwt. or more, £19 12s.; 5 to 10 cwt., £19 13s. 6d.; 2 to 5 cwt., £19 15s.; 1 to 2 cwt., £19 17s. Less than 1 cwt., 3s. 7d. to 3s. 9d. per lb. d/d, according to quantity. Maximum controlled prices.

Tin Oxide.—Nominal.

Zinc Oxide.—Maximum prices per ton for 2-ton lots, d/d; white seal, £34; green seal, £33; red seal, £31 10s.

Zinc Sulphate.—Tech., £20-£21 per ton, carriage paid, casks free.

Rubber Chemicals

Antimony Sulphide.—Golden, 1s. 2d. to 2s. 1½d. per lb. Crimson, 2s. 2d. to 2s. 6d. per lb.

Arsenic Sulphide.—Yellow, 1s. 9d. per lb.

Barytes.—Best white bleached, £8 3s. 6d. per ton.

Cadmium Sulphide.—6s. to 6s. 6d. per lb.

Carbon Bisulphide.—£34 to £39 per ton, according to quality, in free returnable drums.

Carbon Black.—6d. to 8d. per lb., according to packing.

Carbon Tetrachloride.—£44 to £49 per ton, according to quantity.

Chromium Oxide.—Green, 2s ped lb.

India-rubber Substitutes.—White, 6 3/16d. to 10¼d. per lb.; dark, 6 3/16d. to 6 15/16d. per lb.

Lithopone.—30%, £25 per ton; 60%, £31 to £32 per ton. Imported material would be dearer.

Mineral Black.—£7 10s. to £10 per ton.

Mineral Rubber, "Rupron."—£20 per ton.

Sulphur Chloride.—7d. per lb.

Vegetable Lamp Black.—£49 per ton.

Vermilion.—Pale or deep, 15s. 6d. per lb. for 7-lb. lots.

Plus 5% War Charge.

Nitrogen Fertilisers

Ammonium Phosphate.—Imported material, 11% nitrogen, 48% phosphoric acid, per ton d/d farmer's nearest station, in September, £20. Increased charge of 2s. 6d. per month up to March, 1945.

Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station, in September, £9 11s. 6d. Increased charge of 1s. 6d. per month up to March, 1945.

Calcium Cyanamide.—Nominal; supplies very scanty.

Concentrated Fertilisers.—Per ton d/d farmer's nearest station, in September: I.C.I. type "Special No. 1," £14 16s. 6d. Increased charge of 2s. 6d. a month up to March, 1945.

"Nitro Chalk."—£9 14s. per ton in 6-ton lots, d/d farmer's nearest station.

Sodium Nitrate.—Chilean super-refined for 6-ton lots d/d nearest station, £15 5s. per ton; granulated, over 98%, £14 10s. per ton.

Coal Tar Products

Benzol.—90's, 2s. 2d.; nitration grade, 2s. 6d. per gal., ex works.

Carbolic Acid.—Crystals, 11½d. per lb. Crude, 60's, 4s. 3d. to 4s. 6d., according to specification. MANCHESTER: Crystals, 9¾d. to 11½d. per lb., d/d; crude, 4s. to 4s. 6d., naked, at works.

Creosote.—Home trade, 6½d. to 7d. per gal., f.o.r. maker's works. MANCHESTER, 6¼d. to 9¾d. per gal.

Cresylic Acid.—Pale, 97%, 3s. 6d. per gal.; 99%, 4s. 2d.; 99.5/100%, 4s. 4d. American, duty free, 4s. 2d., naked at works. MANCHESTER: Pale, 99/100%, 4s. 6d. per gal.

Naphtha.—Solvent, 90/160°, 2s. 8d. per gal. for 1000-gal. lots; heavy, 90/190°, 2s. 2d. per gal. for 1000-gal. lots, d/d. Drums extra; higher prices for smaller lots. Controlled prices.

Naphthalene.—Crude, ton lots, in sellers' bags, £7 4s. to £10 13s. per ton, according to m.p.: hot-pressed, £12 9s. to £12 14s. per ton, in bulk ex works: purified crystals, £20 15s. to £36 15s. per ton. Controlled prices.

Pitch.—Medium, soft, 50s. to 55s. per ton, f.o.b. MANCHESTER: 60s. to 62s. per ton f.o.b.

Pyridine.—90/140°, 17s. to 17s. 6d. per gal.; 90/160°, 13s.—MANCHESTER, 13s. 6d. to 18s. per gal.

Toluol.—Pure, 2s. 7d. per gal.; 90's, 1s. 11d. per gal. MANCHESTER: Pure, 2s. 7½d. per gal. naked.

Xylol.—For 1000-gal. lots, 3s. 1½d. to 3s. 4d. per gal., according to grade, d/d. Drums extra; higher prices for smaller lots. Controlled prices.

Wood Distillation Products

Calcium Acetate.—Brown, £21 per ton; grey, £24. MANCHESTER: Grey, £24 to £25 per ton.

Methyl Acetone.—40/50%, £56 per ton.

Wood Creosote.—Unrefined, about 2s. per gal., according to boiling range.

Wood Naphtha, Miscible.—4s. 6d. to 5s. 6d. per gal.; solvent, 5s. 6d. per gal.

Wood Tar.—£5 per ton.

Intermediates and Dyes (Prices Nominal)

m-**Cresol** 98/100%.—Nominal.

o-**Cresol** 30/31° C.—Nominal.

p-**Cresol** 34/35° C.—Nominal.

Dichloraniline.—2s. 8½d. per lb.

Dinitrobenzene.—8½d. per lb.

Dinitrotoluene.—48/50° C., 9½d. per lb; 66/68° C., 1s.

p-**Nitraniline.**—2s. 5d. per lb.

Nitrobenzene.—Spot, 5½d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyer's works.

Nitronaphthalene.—1s. 2d. per lb.; P.G., 1s. 0½d. per lb.

o-**Toluidine.**—1s. per lb., in 8/10 cwt. drums, drums extra.

p-**Toluidine.**—2s. 2d. per lb., in casks.

m-**Xylidine Acetate.**—4s. 5d. per lb., 100%

Latest Oil Prices

LONDON.—September 20.—For the period ending September 30 (October 14 for refined oils), per ton, naked, ex mill, works or refinery, and subject to additional charges according to package: LINSEED OIL, crude, £62. RAPESEED OIL, crude, £85. COTTONSEED OIL, crude, £52 2s. 6d.; washed, £55 5s.; refined edible, £57; refined deodorised, £58. COCONUT OIL, crude, £49; refined deodorised, £49; refined hardened deodorised, £53. PALM KERNEL OIL, crude, £48 10s.; refined deodorised, £49; refined hardened deodorised, £53. PALM OIL, refined deodorised, £55; refined hardened deodorised, £58. GROUNDNUT OIL, crude, £56 10s.; refined deodorised, £58; refined hardened deodorised, £62 to £63. WHALE OIL, crude hardened, 42 deg., £51 10s.; refined hardened, 46/48 deg., £52 10s. ACID OILS: Groundnut, £40; soya, £38; coconut, and palm-kernel, £43 10s. ROSIN, 30s. 6d. to 45s. per cwt., ex store, according to grade. TURPENTINE, American, 87s. per cwt. in drums or barrels, as imported (controlled price).

General News

From Week to Week

The Minister of War Transport has decided that operators of passenger or goods vehicles now using producer gas may revert to liquid fuel operation.

The Minister of Food has revoked the retail and wholesale licences granted to W. C. Foyle & Sons, Limited, 14 Devonshire Row, Bishopsgate, London, E.C.2.

Cefoil, Ltd., have begun the erection of a seaweed processing factory at Boisdale, South Uist, in the Outer Hebrides, and it is hoped that this will be in operation by the early winter

Lord Bennett has presented £1500 to the Royal Society of Arts, and the council has endorsed a suggestion that it should be applied to the institution of a Bennett Empire Prize of 100 guineas, to be awarded every second or third year.

Scottish lime supplies are now in better volume and, with an easier demand at the moment, an appeal has been made to users, particularly farmers who can take delivery of large amounts, to place orders now and so ensure that they will receive first delivery.

The Netherlands Chamber of Commerce in London has formed a commercial research committee with the object of studying special subjects affecting or likely to affect trade between the Netherlands empire and the British Commonwealth of Nations.

A reprint, with an amendment list, of Specification D.T.D. 546—Aluminium-coated High Tensile Aluminium Alloy Sheets and Coils (Solution-treated and Artificially Aged), has been issued by the Ministry of Aircraft Production (H.M.S.O., 1s.).

Stepping-up their weekly contributions to the Red Cross Penny-a-Week Fund is one way in which Londoners are expressing their satisfaction at the end of the Battle of London. Large numbers of new contributing members have also been enrolled during the last few days.

An exhibition of the Stanton Ironworks Company's war effort was opened on September 9, and is to continue for two weeks, the aim being to encourage the workers by showing the results of their individual activities The resources of the firm have been exploited by all the Supply Departments and in particular the Ministry of Supply, which is co-operating with the Stanton Company in arranging the exhibition. Mr. F. W. Scopes, managing director of the company, presided at the opening ceremony, which was performed by Mr. A. C. MacDiarmid, the chairman, who is president of the British Iron and Steel Federation.

Patulin has not proved of any value in the treatment of the common cold. This observation is the result of investigations conducted by a group of Army authorities and a team of workers for the Medical Research Council, as reported in the *Lancet*.

An assistant at the National Physical Laboratory, Thomas William Prown, aged 24, pleaded "Guilty" at the Central Criminal Court, on Friday last week, to offences contravening the provisions of the Defence Regulations, and was sentenced on Monday to 15 months' imprisonment. It was alleged that he professed to be an anarchist, and that he printed and circulated seditious leaflets.

Nine men were injured and one killed in an explosion in a gas purifying chamber at Leicester Corporation gasworks on September 11. At the inquest, the coroner, recording a verdict of "accidental death," said there was no evidence of any breach of rules or regulations. The works superintendent said that the men were emptying the chamber in which iron oxide was used as a purifying material. They were using bronze picks to prevent any possibility of a spark. Evidently a pocket of gas had become ignited.

Foreign News

The Government of India has sanctioned a sum of Rs. 4,00,000 for the establishment of a Central Glass and Silicate Research Institute at Calcutta.

More synthetic oil plants in Germany, at Merseburg and Lutzkendorf, both near Leipzig, and at Ludwigshafen, have been attacked by Flying Fortresses.

In India the use of shark-liver oil for pharmaceutical purposes has been started from fish caught off the coast of Sind and Baluchistan. Plants have been established in Bombay, Karachi, Calcutta and Baroda.

A report from France says that two new motor fuels are now being produced, viz.: CA1 containing 30 per cent. dehydrated alcohol, 55 per cent. motor spirit, and 15 per cent. benzol; and CA2 containing 80 per cent. dehydrated alcohol and 20 per cent. motor spirit.

An educational agreement between Great Britain and Belgium envisaging, *inter alia*, the exchange of university professors, has been prepared for signature which is to take place in Brussels as soon as conditions permit. The Belgian educational authorities, THE CHEMICAL AGE learns from an authoritative source, anticipate a resumption of regular academic activities this autumn. A large influx of new entrants to the universities is being expected.

Penicillin is now being produced in Bombay. Working in close collaboration with British and American scientists, the staff of Haffkine Institute, Bombay, is growing small cultures of penicillin mould under low temperature. From these penicillin will be extracted later.

The manufacture of a new heat-resistant plastic that can withstand boiling has been announced by the Monsanto Chemical Co. It is also resistant to corrosive chemicals and has excellent electrical insulating properties, high rigidity and strength. It is a synthetic copolymer containing carbon, hydrogen and nitrogen.

In Brazil an increase in the capital of the Companhia Siderúrgica Nacional from 500,000,000 to 1,000,000,000 cruzeiros recently was authorised. The Cia. Vale do Rio Doce S.A., in charge of the Itabira iron ore development project, was also authorised to increase its capital from 200,000,000 to 300,000,000 cruzeiros.

Tariff protection in the post-war period is likely to be demanded by the Spanish chemical and pharmaceutical industries which have expanded not a little during the war. The chief new enterprise, the Unión Química del Norte de España, with a capital of 80 million pesetas, is preparing to enter the Portuguese and South American markets after the war.

After 2½ years of experiment, the Goodyear Tyre and Rubber Company reports, according to the New York correspondent of *The Times*, that it has developed a new process for the manufacture of synthetic rubber which could increase America's capacity for synthetic rubber output by 40 per cent.—approximately 1,338,000 long tons per annum.

A patent has been granted (U.S.P. No. 2,352,199) to Professor V. N. Ipatieff and George Monroe, of Chicago, for a method of making synthetic toluene (tri-nitro-toluene) from benzene and methane, under pressure of 50 to 450 atmospheres, at a temperature of from 350 to 750° C., in the presence of a catalyst.

In Brazil, the production of citric acid has been taken up by the Matarazzo Company at Fazenda Amalia. It is expected that the present daily output of about 400 kg. will eventually be increased to 1000 kg. Brazil's total requirements aggregate some 15,000 kg. monthly, the S. Paulo district consuming roughly one-half. Before the war, Brazil bought citric acid from Germany and Italy, imports totalling over 200,000 tons in 1939.

The secondary lead industry in the U.S.A. recovered, in 1943, 341,243 short tons of lead, compared with 323,001 tons in 1942; this was still 56,000 tons below the 1941 record, according to the Bureau of Mines. Increased recovery was most pronounced in solder, in which 33,529 tons were reclaimed, against 17,611 tons in 1942. With plenty of scrap available, increase in recovery could have been greater but for a shortage of manpower.

Bombers of the 15th Air Force, operating from Italy, last week attacked the Oderthal synthetic oil refinery, 75 miles S.W. of Breslau, and the I.G. synthetic oil and rubber plant at Oswiecim, 30 miles west of Cracow, in Poland.

Forthcoming Events

The 34th ordinary meeting of the **British Society for International Bibliography** will be held in the Council Room at the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, W.C.2, on **September 26,** at 2.30 p.m. Dr. S. C. Bradford will read a paper on "Some General Principles of Bibliographical Classification, with application to the Universal Decimal Classification." A paper on "The Classification of Literature in the Technical Department of an Oil Company," by C. L. Gilbert, B.Sc., F.Inst.Pet., and C. G. Gray, B.Sc., Asiatic Petroleum Co., will follow.

At the general meeting of the **Institute of Welding,** to be held at the Institution of Civil Engineers, Great George Street, London, S.W.1, at 6 p.m., on **September 27,** Mr. W. W. Watt, the president, will deliver an address dealing with the post-war organisation of the Institute.

There will be a meeting of the **Institute of Fuel** at the Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, on **September 27,** at 2.30 p.m., when a paper on "Superheaters for Water-Tube Boilers" will be read by Messrs. L. C. Southcott and D. W. Rudorff.

The Birmingham and Midland section of the **Royal Institute of Chemistry** will hold, jointly with the **Institute of Physics,** a meeting in the Connaught Room, Imperial Hotel, Birmingham, on **September 29,** at 6.30 p.m., when Dr. G. W. Scott Blair, of the National Institute for Research in Dairying, will read a paper on the "Rheology of Plastics: Stress-Strain-Time Relations for High Polymers and Similar Materials."

The next meeting of the Manchester Group of the British Section of the **International Society of Leather Trades' Chemists** will be held at the Engineers Club, 17a Albert Square, Manchester, on **September 30,** when Mr. E. G. Cockbain, M.Sc., Ph.D., will read a paper entitled "Some Physico Chemical Aspects of Tanning and Dyeing Processes." Two films will be shown, *viz.*: "This is Colour" (I.C.I., Ltd.), and "The Romance of Leather" (Rich. Hodgson & Sons, Ltd.). Members who wish to attend, should notify the Hon. Secretary of the Manchester Group, Mr. R. Denyer, 6 Rothbury Gardens, Adel, Leeds, 6.

The London Section of the **Society of**

Chemical Industry is holding its opening meeting of the 1944-45 session on **October 2**, in the rooms of the Chemical Society, Burlington House, W.1, at 2.30 p.m., when Dr. R. T. Colgate will deliver his address as chairman. His subject is "Technics of Tin," and the address will be illustrated by lantern slides of British and American plant, especially concerning continuous strip tinplate. Members of the Chemical Engineering Group are particularly invited to this meeting.

On **October 4**, at 2.30 p.m., Dr. H. R. Fehling will present the first paper in the series on "Thermal Insulation" to the **Institute of Fuel**, at the Institution of Mechanical Engineers, Storey's Gate, London, S.W.1.

A dance in aid of the R.I.C. Benevolent Fund will be held by the Birmingham and Midlands section of the **Royal Institute of Chemistry** at the Ritz Ballroom, Edmund Street, Birmingham, on **October 6** (Reception 6 p.m. Dancing 6.30 to 9.30 p.m.).

The Manchester section of the **Society of Chemical Industry** meets at the Grand Hotel, Aytown Street, on **October 6**, at 5.45 p.m., to hear papers on "High Frequency Heating," by E. T. Norris, and "Infra-Red Heating," by Miss A. M. Fletcher.

A joint meeting of the Food Group of the **Society of Chemical Industry** and of the Glasgow section will take place on **October 6**, at 7.15 p.m., in the Royal Technical College, George Street, Glasgow. The following papers will be presented: "Theoretical and Practical Aspects of Fish Curing," by Dr. J. M. Shewan and Dr. C. L. Cutting, and "Smoking and Drying of Meat," by Mr. T. Howard.

The annual luncheon of the **Institute of Fuel** will be held at the Connaught Rooms, London, W.C.2, on **October 12** (12.30 for 1 p.m.). Lord Woolton will be the principal guest. The President, Dr. E. W. Smith, will address the meeting, and Dr. J. G. King will deliver the Melchett Lecture at 2.15 p.m.

The annual meeting of the **Society of Chemical Industry**, which was postponed in July, will take place on **October 13**, at 2.30 p.m., at the Royal Institution, Albemarle Street, W.1. The proceedings will commence with the conferment of Hon. Membership of the Society, on Dr. Wm. Cullen, to be followed by the presentation of the Messel Medal to Professor A. V. Hill, F.R.S., who will read his address entitled "Science in India." Tea will be served in the wing library at 4 p.m.

Company News

Unchanged interim dividends are being paid by **William Blythe & Co., Ltd.** (5 per cent.) and **International Paint & Compositions Co., Ltd.** (4 per cent.).

Net trading profit of the **Staveley Coal and Iron Co., Ltd.**, for the year ended June 30, was £829,122 (£780,420). A final ordinary dividend of 4½ per cent. brings the total to 7 per cent., tax free (6½ per cent.). Forward, £151,059 (£138,629).

The Leeds Fireclay Co., Ltd., announces a profit, for the year ended June 30, of £16,893 (£39,999). Dividend on the 6 per cent. non-cumulative preference shares is 4 per cent. (6 per cent.), and on ordinary shares nil (4 per cent.).

Imperial Chemical Industries, Ltd., declare an interim dividend of 3 per cent. (same) on the ordinary stock, payable (less income tax, reduced by dominion income tax relief at 7d. in the £) on December 1.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Companies Winding-up Voluntarily

KERSAL BLEACHING CO., LTD. (C.U.W.V., 23/9/44). Sept. 7. By special resolution. Herbert Johnson, Blackfriars House, Parsonage, Manchester, appointed liquidator.

IRKDALE BLEACHWORKS CO., LTD. (C.W.U.V., 23/9/44). Sept. 7. By special resolution. Herbert Johnson, Blackfriars House, Parsonage, Manchester, appointed liquidator.

New Companies Registered

C. & M. Medical Products, Ltd. (389,714).—private company. Capital: £1000 in 1000 shares of £1 each. Manufacturers of and dealers in pharmaceutical and medicinal preparations, etc. Directors: C. Williams, Winscombe, Somerset; Hilda M. Williams, Weston-super-Mare.

C. Bradbury (Drugs), Ltd. (389,781).—Private company. Capital: £1000 in £1 shares. Manufacturers of and dealers in chemical, industrial and other preparations, etc. Subscribers (each with one share): G. G. Watt (permanent governing director); H. M. Birsley. Solicitors: Rich and Hughes, 211 Streatham High Road, S.W.16.

Minerva Mouldings, Ltd. (389,615).—Private company. Capital £5000 in 5000 shares of £1 each. Manufacturers of and dealers in organic and inorganic chemical substances and products, natural and synthetic plastics, etc. Directors: J. G. Statter; G. S. Marston; S. L. Forwood, C.A. Registered office: 82 Victoria Street, London S.W.1.

Chemical and Allied Stocks and Shares

ALTHOUGH not very active, stock markets developed a better tendency, industrial shares showing a further rally, home rails also improving, and British Funds remaining firm and again tending to move higher. Yield considerations attracted buying, particularly in the case of iron and steel shares, which on balance have shown good recovery from their recent decline. Imperial Chemical were firm at 37s. 9d. "ex" the maintained interim dividend; the market remains confident that the total dividend is again likely to be brought up to 8 per cent., on which basis the yield at the current price has an attractive appearance. British Aluminium at 47s. 9d. lost part of an earlier improvement, but British Oxygen at 86s. 3d. showed a strong rally. Lever & Unilever have been active around 42s. 9d. awaiting the financial results, with Lever N.V. at 43s. 9d. showing recovery from an earlier decline, and various other shares of companies with important Dutch interests also higher, including Royal Dutch Oil at 37s. Imperial Smelting moved higher at 18s. 9d., and Triplex Glass at 42s. were firmer pending the dividend announcement. Turner & Newall strengthened to 80s. 3d., United Molasses to 36s. 6d., and Wall Paper Manufacturers deferred to 42s. Murex moved up to 96s. 3d., and De La Rue to 182s. 6d., but Borax Consolidated reacted to 36s. 3d.

Among iron and steels, Stewarts & Lloyds recovered strongly to 53s., Tube Investments at 93s. also being better. United Steel were 24s. 6d., Guest Keen 37s. 9d., and Dorman Long 26s. 6d. Babcock & Wilcox were 49s., Neepsend Steel 30s. 9d., Staveley 51s. 6d., and Allied Ironfounders 51s. 9d. Davy Engineering were 30s. 3d., Consett Iron 8s., and Firth Brown 69s. 4½d. Elsewhere, after an earlier decline, British Plaster Board rallied to 37s. 6d., Associated Cement to 66s., British Match to 41s. 9d., and Pinchin Johnson to 37s. Metal Box ordinary shares were 90s., Pressed Steel 30s. 9d., and Imperial Smelting 14s. 3d. Thomas W. Ward ordinary were 34s. 9d., awaiting the financial results. Textiles moved slightly better, including Bleachers at 12s. 7½d., Fine Spinners at 24s. 6d., and Bradford Dyers at 23s. 9d. Courtaulds at 55s. were slightly easier, but British Celanese became firmer at 28s. 6d. Gas Light & Coke at 23s. 6d., and South Metropolitan Gas stock at 96½ maintained their better tendency. In other directions, B. Laporte continued firm at 85s., while Monsanto Chemicals 5½ per cent. preference kept at 23s. Cellon 5s. ordinary were 24s. 6d., and British Drug Houses 27s. 6d. Greeff-Chemicals 5s. ordinary were 8s., and W. J. Bush ordinary 65s.

Boots Drug were 55s. 6d., again showing an upward trend, while Sangers were 27s. 7½d., Beechams deferred 18s. 7½d., and Timothy Whites 38s. 9d. The units of the Distillers Co. at 101s. 9d. showed a good rally from an earlier decline. Dunlop Rubber strengthened to 45s. 6d., but elsewhere, General Refractories 10s. shares have eased to 16s. 4½d. Lewis Berger were 108s., and International Paint 113s. 9d. Barry & Staines were higher at 50s. 6d., and Nairn & Greenwich firm at 73s. 9d., with Qualcast 35s. 6d. Low Temperature Carbonisation 2s. ordinary changed hands around 2s. 9d. Brightside Foundry were 32s. 3d. following publication of the results showing maintenance of the dividend. British Glues 4s. ordinary remained firmly held and quoted at 8s. 9d. Steel & Co.'s 5s. ordinary shares were 14s., the dividend of these engineers, ironfounders, etc., being further increased to 12½ per cent. Oil shares moved higher under the lead of Anglo-Iranian which rose to 123s. 9d. prior to the dividend announcement. Burmah Oil rose to 90s., and "Shell" to 85s. with Ultramar 77s. Attock Oil reacted to 69s. 9d., following the announcement of the maintained dividend.

WANTED

MACHINE for dipping objects in Cellulose Lacquer. Advertiser wishes to contact makers of a machine on continuous-travel principle, for carrying small objects through lacquer for coating. Automatic unloading preferred. Box No. 2185, THE CHEMICAL AGE, 154, Fleet Street, E.C.4.

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WORKING NOTICE

THE Proprietors of British Patent No. 466,710 for "Improvements in Colour Photography," desire to enter into negotiations with a Firm or Firms for the sale of the Patent, or for the grant of licences thereunder. Further particulars may be obtained from MARKS & CLERK, 57 and 58, Lincoln's Inn Fields, London, W.C.2.

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